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*Neodiprion taedae linearis*, A Pest  
of Loblolly and Shortleaf Pines

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The sawfly *Neodiprion taedae linearis* Ross has in recent years come to be recognized as one of the most serious insect pests in loblolly and shortleaf pine stands in the south-central States. Although it seldom, if ever, kills trees, it causes huge losses by destroying the needles and thus retarding growth.

This sawfly was first observed in 1940 on loblolly pine in south Arkansas. An outbreak involving a gross area of some 3 million acres occurred in that State from 1945 to 1948. Studies made at the time produced the first evidence of its marked effect on diameter growth.

Since 1948, this sawfly has been abundant in small areas in south Arkansas, central Louisiana, and southeast Texas. In 1956, scattered infestations were found on 1,400 acres of pine in southeast Missouri. By 1957, this outbreak had increased to 2,500 acres and aerial spraying was required to check it.

### Hosts

In Arkansas, Louisiana, and Texas the preferred host tree for this sawfly is loblolly pine, since shortleaf pine is seldom more than lightly defoliated even when growing in mixture with severely defoliated loblolly. The recent outbreak in Missouri occurred on shortleaf pine. Besides loblolly and shortleaf pine, no other pine species is known to have been attacked. The sawfly is found chiefly on medium-sized or large trees in forest stands.

### Injury

Newly hatched larvae feed in groups, often with 5 or 6 tiny larvae completely encircling each needle. They girdle the needle by consuming the soft outer tissue, leaving the remainder to turn reddish brown. Twigs on which the needles have been thus damaged and discolored are often called "flags" because they can be observed easily from the ground or from low-flying aircraft. Older larvae feed singly or in pairs and consume the entire needle, leaving short stubs on the branch. They still retain their gregarious habit, however, and move in a group from branch to branch (fig. 1).

For the most part, only the older foliage is eaten by this sawfly, but on shortleaf pine the terminal buds and tender bark on the new growth are occasionally consumed also. In heavily infested areas (fig. 2) trees may be completely defoliated early in the spring before the new shoots and needles have developed. Nevertheless, within a few months the new growth restores the normal appearance of the trees. So far, no trees are known to have died from defoliation by this sawfly. Diameter growth, however, may be reduced by 50 percent or more for several years.

### Description

The female adult is about  $\frac{3}{8}$  inch long with 4 wings, an orange and black body, and threadlike antennae. The male is about  $\frac{1}{4}$  inch





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Figure 1.—Larvae feed in groups, defoliating one twig after another.

long with 4 wings, an entirely black body, and feathery antennae.

The newly hatched larva has a shiny black head and a gray-green body. Older larvae have dull green bodies with heavy black stripes along each side and often two lighter stripes below the heavy ones. When full grown, the larva is about 1 inch long and has a dark brown head.

### Life History

There is only one generation each year. The eggs hatch from early March until mid-April, depending upon the weather and other local conditions. A larva completes its feeding in 30 to 40 days, then drops to the ground and spins a mahogany-colored capsulelike cocoon in the topsoil or litter. In October or November, pupation takes place and the adult emerges shortly thereafter. Mating and egg-laying begin immediately. The female cuts or

“saws” from two to ten pockets in each of several needles and deposits a small whitish-yellow egg in each slit. The distance between the egg slits on the needle is about the length of the female’s body. Each female lays from 90 to 120 eggs, often all in the needles of one twig. The egg is the overwintering stage for this sawfly.

### Control

An important natural control agent of this sawfly is a polyhedral virus that sometimes destroys large numbers of the larvae. Sustained low temperatures and rainy spells in the spring also render the larvae inactive, so that many probably die from starvation or disease. Sometimes rodents destroy many cocoons. So far, very little predation by birds has been observed.

Fourteen species of larval parasites have been collected or reared. Of these, perhaps the most impor-





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Figure 2.—Mature trees, as well as reproduction, may be completely defoliated by this sawfly.

tant are a parasitic fly, *Anthrax sinuosa* (Wied.), and an ichneumon wasp, *Exenterus canadensis* (Prov.). No egg parasites have been collected so far. The overall effectiveness of these natural control factors in holding sawfly populations in check has not been determined. However, they have not been effective in preventing all outbreaks.

Since this sawfly is found chiefly on medium-sized or large trees in forest stands, aerial spraying is the most economical form of control. For best results, insecticides should be applied as soon as possible after the eggs have hatched in the early spring.

A solution of DDT in fuel oil has been found very effective when ap-

plied at the rate of 1 pound of technical DDT per acre. It can be made (1) by dissolving one pound of technical DDT in one quart of an auxiliary solvent such as xylene, and adding fuel oil to make one gallon of the final spray solution, or (2) by merely diluting an oil-soluble DDT concentrate with enough No. 2 fuel oil to make a 12½ percent DDT spray solution.

Occasional trees of unusual value can be protected by applying a 1-percent water emulsion of DDT with a garden-type sprayer or power

sprayer. Oil sprays should not be applied with ground spray equipment because the oil carrier may burn the foliage.

**Caution:** DDT is a poison. Avoid prolonged exposure to the technical material or the spray. Heed the warnings on the container. Although oil solutions are less toxic to aquatic life than emulsifiable or wettable mixtures, care should always be taken to prevent overdosing ponds, lakes, and streams when forests are sprayed.